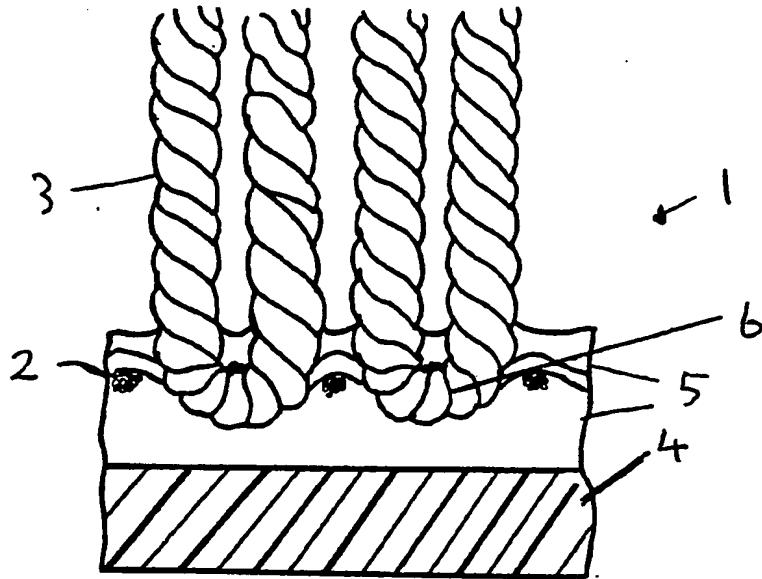




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

|   |  |   |   |
|---|--|---|---|
| (51) International Patent Classification 5 :<br><br>B32B 5/08, 27/04, A47G 27/02  |  | A1  | (11) International Publication Number: WO 91/00804<br><br>(43) International Publication Date: 24 January 1991 (24.01.91) |
| <p>(21) International Application Number: PCT/GB90/01057</p> <p>(22) International Filing Date: 9 July 1990 (09.07.90)</p> <p>(30) Priority data:<br/>8915662.4 7 July 1989 (07.07.89) GB</p> <p>(71) Applicant (<i>for all designated States except US</i>): G.R.F. SPORTS SERVICES LIMITED [GB/GB]; Suite 2, Regarth Chambers, 180 South Street, Romford, Essex RM1 1RL (GB).</p> <p>(72) Inventor; and</p> <p>(75) Inventor/Applicant (<i>for US only</i>) : WALTERS, Ian, David [GB/GB]; Yr-Garth, Pentwyn Road, Betws, Ammanford, Dyfed SA18 2EY (GB).</p> <p>(74) Agent: AUSTIN, Hedley, William; Urquhart-Dykes &amp; Lord, Alexandra House, Alexandra Road, Swansea, West Glamorgan SA1 5ED (GB).</p> |  | <p>(81) Designated States: AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH (European patent), CM (OAPI patent), DE (European patent)*, DK (European patent), ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), HU, IT (European patent), JP, KP, KR, LK, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL (European patent), NO, RO, SD, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.</p> <p><b>Published</b><br/> <i>With international search report.<br/> Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> |   |

## (54) Title: SURFACE COVERING MATERIAL



## (57) Abstract

The material is a laminate comprising, in the order specified (a) an outer layer of preformed textile fabric (1) (such as a tufted fabric having a base (2) and tufts (3)); (b) a continuous bonding layer (5) of hydrophobic hot melt adhesive (5) which encapsulates the "bundle" portion (6) of the tufts (3) as well as the base (2) and leaves only the free ends of the tufts protruding above the surface, such that the laminate is liquid-impermeable; and (c) a backing layer (4).

\* See back of page

## **DESIGNATIONS OF "DE"**

Until further notice, any designation of "DE" in any international application whose international filing date is prior to October 3, 1990, shall have effect in the territory of the Federal Republic of Germany with the exception of the territory of the former German Democratic Republic.

### ***FOR THE PURPOSES OF INFORMATION ONLY***

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

|    |                          |    |  |    |                          |
|----|--------------------------|----|--|----|--------------------------|
| AT | Austria                  | ES | Spain                                    | MC | Monaco                   |
| AU | Australia                | FI | Finland                                  | MG | Madagascar               |
| BB | Barbados                 | FR | France                                   | ML | Mali                     |
| BE | Belgium                  | GA | Gabon                                    | MR | Mauritania               |
| BF | Burkina Faso             | GB | United Kingdom                           | MW | Malawi                   |
| BG | Bulgaria                 | GR | Greece                                   | NL | Netherlands              |
| BJ | Benin                    | HU | Hungary                                  | NO | Norway                   |
| BR | Brazil                   | IT | Italy                                    | PL | Poland                   |
| CA | Canada                   | JP | Japan                                    | RO | Romania                  |
| CF | Central African Republic | KP | Democratic People's Republic<br>of Korea | SD | Sudan                    |
| CG | Congo                    | KR | Republic of Korea                        | SE | Sweden                   |
| CH | Switzerland              | LJ | Liechtenstein                            | SN | Senegal                  |
| CM | Cameroon                 | LK | Sri Lanka                                | SU | Soviet Union             |
| DE | Germany                  | LU | Luxembourg                               | TD | Chad                     |
| DK | Denmark                  |    |  | TG | Togo                     |
|    |                          |    |  | US | United States of America |

### Surface Covering Material

The present invention is concerned with surface covering materials, and, in particular, textile-based surface covering materials, which in some embodiments are useful as floor covering for hospitals and the like.

Liquid-impermeable textile-based floor coverings are known (for example, the floor covering commercially available under the trade mark "Flotex", which comprises polyamide flocked into a PVC base). Such impermeable floor coverings find applications in indoor areas where there is a risk of spillages, such as in kitchens, patient areas in hospitals and the like.

We have developed an improved liquid-impermeable surface covering material suitable for uses of this nature.

The material according to the present invention comprises a laminate comprising, in the order specified:

- (a) an outer layer comprising a preformed synthetic textile fabric;
- (b) a bonding layer comprising a hydrophobic hot melt adhesive; and
- (c) a backing layer, in which the outer layer is bonded to the backing layer by means of the bonding layer in such a way that the adhesive penetrates through the textile fabric to encapsulate fibres which run substantially parallel to the major faces of the backing layer and form a substantially liquid-impermeable layer from which substantially only fibres running transverse to the major faces of the backing layer protrude to form an outer surface of said layer.

The outer layer may be a woven, tufted or non-woven fabric (such as a needle felt) of a conventional textile fibrous material, such as polypropylene, or a polyamide, which may, in some embodiments, be conventional

-2-

Wilton or Axminster carpeting material. Because of the preferred uses of the surface covering material according to the invention (as referred to above), it is preferred that the fibrous material should be such that it is either inherently soil-resistant (such as polypropylene), or treated so as to have good soil-resistance qualities.

The hot melt adhesive employed in the laminate according to the invention is typically a thermoplastic synthetic hydrocarbon polymer-based formulation, such as atactic polypropylene or other amorphous polyolefin, such as polybutene. The adhesive is preferably one which retains some tack at room temperature, and which is substantially incurable by means of elevated temperature alone. The adhesive formulation should be hygroscopic and substantially free of any hygroscopic ingredients. The hot melt adhesive is applied in such a way that it surrounds (or encapsulates) substantially all of the individual fibres making up the base of the outer layer (the "bundles" in a woven or tufted fabric).

The hot melt adhesive may, in a preferred embodiment of the invention, contain a biocide (that is, a bactericide or fungicide), typically in an amount of up to 10% by weight, based on the weight of the hot melt adhesive; the biocide should, of course, be thermally resistant.

The backing layer may comprise a hydrophobic, substantially liquid-impermeable, flexible polymer sheet material. The backing layer may be in the form of a flexible foam (in which case it is preferably a closed cell foam of a hydrophobic polymer, such as polyethylene or ethylene-vinyl acetate copolymer), or a polymer film (when again it is preferably of a hydrophobic polymer, such as polyethylene or ethylene-vinyl acetate copolymer).

In an alternative embodiment, the backing layer may be of a textile fabric, which may be woven, non-woven, or tufted; such a backing layer need not be of synthetic material and may, for example, be of a scrim or hessian or the like.

-3-

The laminate according to the invention may be in the form of tiles or other space-filling shapes. The laminate may be in the form of a room-filling module (that is, a single body of the laminate may fill substantially the entire floor area in a room). The laminates may be used for other purposes such as, for example, vehicle floor covering or wall covering.

The laminate may be provided with a layer of pressure-sensitive adhesive on the undersurface of the backing layer, by means of which the laminate according to the invention may be secured to a floor or the like. In this case, a removable backing layer is preferably provided over the layer of pressure-sensitive adhesive, such that the backing layer acts as a 'peel and stick' layer. Such a removable backing layer may be of, for example, silicone-coated paper.

It is particularly preferred that the hot melt adhesive should be sprayed, in a molten state, into a space between the upper surface of the backing layer and the undersurface of the outer layer. The layers are then preferably passed through rollers (such as pinch rollers) so as to effect lamination and penetration of the fabric constituting the outer layer.

It is particularly preferred that the hot melt adhesive should be sprayed at a temperature close to its carbonisation temperature (that is, within about 30°C, preferably within 20°C and sometimes even within 10°C of the carbonisation temperature), and substantially above the softening point of the fibres or backing layer to which it is applied. Conventionally, hot melts are not applied at such high temperatures, and manufacturers instructions invariably suggest that hot melt adhesives should be applied at substantially below the carbonisation temperature thereof. The conventional methods of applying hot melt adhesives (that is, by roller application or dipping) are not preferred because such methods may cause too much heat transfer and therefore the risk of softening the relevant fabric, and, furthermore, may

-4-

not result in sufficient penetration of the outer layer so as to render the outer layer liquid-impermeable.

The present invention will now be described, by way of example only, with reference made to the accompanying drawings; in which:

Figure 1 illustrates (not to scale) a typical layer structure for use as a surface covering material according to the invention; and

Figure 2 is a schematic illustration of part of an exemplary production process for a surface covering material according to the invention.

Referring to Figure 1, there is shown a laminate comprising a tufted outer layer 1 comprising a woven fabric 2 and tufts 3, and a backing layer 4 comprising a hydrophobic, liquid-impermeable, flexible polymer sheet material. The backing layer 4 and the outer layer 1 are bonded together by means of a continuous layer 5 of hot melt adhesive which encapsulates the 'bundle' portion 6 of the tufts 3 as well as woven fabric 2.

Referring to Figure 2, a spray gun 11 has molten adhesive supplied thereto by supply conduit 12; the molten adhesive is sprayed from nozzle 13 to the space 14 between outer layer 1 and backing layer 4 (using the same reference numerals as in Figure 1). The coated surfaces of layer 1 and layer 4 are brought into contact using forming rollers 17 and 18, and then further pressed together using nip rolls 19 and 20. This pressure causes partial penetration of the hot melt into the outer layer 1, such that the hot melt forms a liquid-impermeable layer from which only tufted fibres (not shown in Figure 2) protrude to form the upper surface of the resulting laminate.

The present invention has been described in terms of a laminate suitable for use as a floor covering, and a method of production thereof; the present invention further comprises a floor having thereon a layer of a laminate according to the invention.

## Claims:

1. A surface covering material, which comprises a laminate comprising, in the order specified,
  - (a) an outer layer comprising a preformed synthetic textile fabric;
  - (b) a bonding layer comprising a hydrophobic hot melt adhesive; and
  - (c) a backing layer; characterised in that the outer layer is bonded to the backing layer by means of the bonding layer in such a way that the adhesive penetrates through the textile fabric to encapsulate fibres which run substantially parallel to the major faces of the backing layer and form a substantially liquid-impermeable layer from which substantially only fibres running transverse to the major faces of the backing layer protrude to form an outer surface of said layer.
2. A surface covering material according to claim 1, wherein said hot melt adhesive is a thermoplastic synthetic hydrocarbon polymer-based formulation.
3. A surface covering material according to claim 1 or 2, wherein the adhesive retains some tack at room temperature, and is substantially incurable by means of elevated temperature alone.
4. A surface covering material according to any of claims 1 to 3, wherein the adhesive is hygroscopic and substantially free of any hygroscopic ingredients.
5. A surface covering material according to any of claims 1 to 4, wherein the adhesive contains a biocide.

-6-

5. A surface covering material according to any of claims 1 to 4, wherein the backing layer comprises a hydrophobic, substantially liquid-impermeable, flexible polymer sheet material.
6. A surface covering material according to any of claims 1 to 5, wherein the backing layer is in the form of a flexible foam, which is preferably a closed cell foam of a hydrophobic polymer.
6. A surface covering material according to any of claims 1 to 5, wherein the backing layer is of a textile fabric.
7. A surface covering material according to any of claims 1 to 6, which is provided with a layer of pressure-sensitive adhesive on the undersurface of the backing layer, and, optionally, a removable backing layer provided over the layer of pressure-sensitive adhesive.
8. A method of producing a surface covering material according to any of claims 1 to 6, wherein the hot melt adhesive is sprayed, in the molten state, into a space between the upper surface of the backing layer and the undersurface of the outer layer.
9. A method according to claim 8, wherein said layers are passed through rollers after application of said hot melt adhesive.
10. A method according to claim 8 or 9, wherein said hot melt adhesive is sprayed at a temperature within 30°C of the carbonisation temperature) thereof.
11. A floor having thereon a layer of a surface covering material according to any of claims 1 to 7.

11

✓ Fig. 1

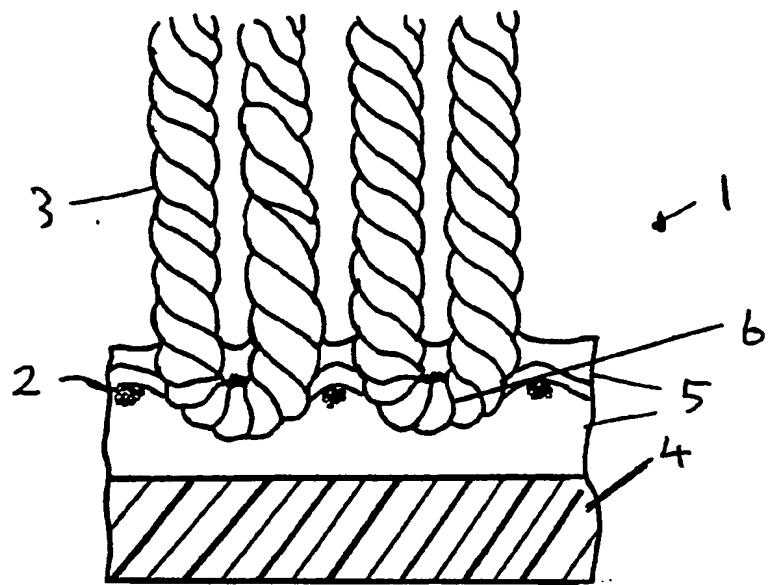
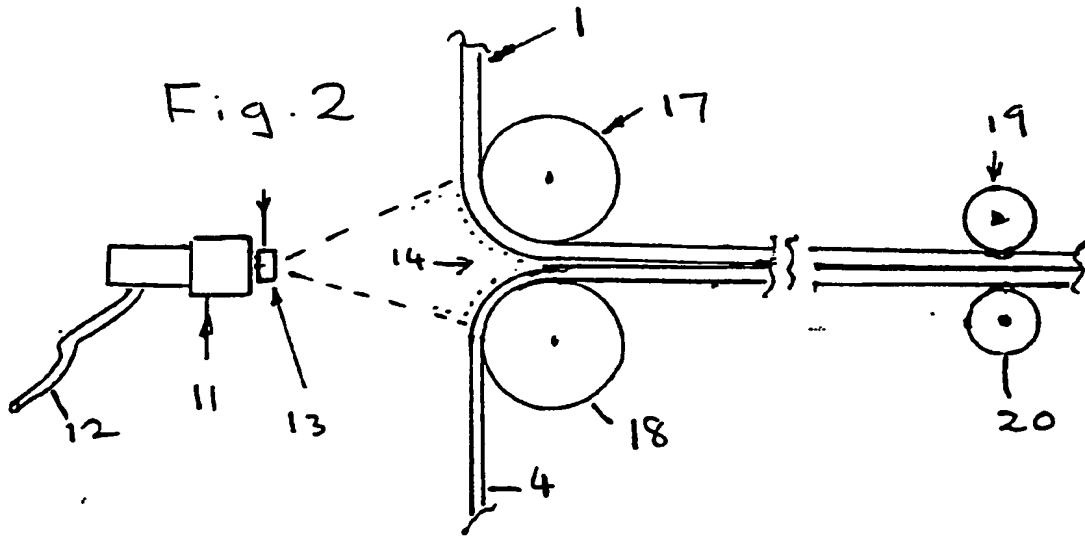


Fig. 2



## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 90/01057

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all)<sup>6</sup>According to International Patent Classification (IPC) or to both National Classification and IPC  
Int.Cl. 5 B32B5/08 ; B32B27/04 ; A47G27/02

## II. FIELDS SEARCHED

Minimum Documentation Searched<sup>7</sup>

| Classification System | Classification Symbols |
|-----------------------|------------------------|
| Int.Cl. 5             | B32B ; A47G27          |

Documentation Searched other than Minimum Documentation  
to the Extent that such Documents are Included in the Fields Searched<sup>8</sup>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup>

| Category <sup>10</sup> | Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>   | Relevant to Claim No. <sup>13</sup> |
|------------------------|--|-------------------------------------|
| A                      | US,A,3940525 (BALLARD) 24 February 1976<br>see column 2, lines 13 - 18<br>see column 2, lines 56 - 64<br>see column 3, lines 38 - 49<br>see column 4, lines 32 - 42<br>see column 4, line 53 - column 5, line 16;<br>figure<br>see column 10, lines 12 - 17<br>--- | 1, 2, 5,<br>8, 9, 11                |
| A                      | GB,A,1168285 (POLYMER CORP. LTD.)<br>22 October 1969<br>see page 2, lines 41 - 92<br>see page 3, line 110 - page 4, line 5; figure 1<br>---  | 1, 2, 6,<br>8, 9, 11                |
| A                      | US,A,3519526 (R.J. CAREY ET AL.) 07 July 1970<br>see column 1, line 17 - column 2, line 4<br>see column 2, lines 35 - 44<br>see column 3, line 54 - column 4, line 15;<br>figure 1<br>---  | 1, 2, 8,<br>11<br>-/-               |

° Special categories of cited documents :<sup>10</sup>

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

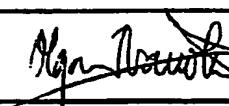
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

## IV. CERTIFICATION

| Date of the Actual Completion of the International Search   | Date of Mailing of this International Search Report   |
|---|---|
| 2<br>19 NOVEMBER 1990                                       | 04.12.90  |
| International Searching Authority<br>EUROPEAN PATENT OFFICE | Signature of Authorized Officer<br>IBARROLA TORRES O.  |

| III. DOCUMENTS CONSIDERED TO BE RELEVANT<br>(CONTINUED FROM THE SECOND SHEET) |   |                       |
|---|---|-----------------------|
| Category  | Citation of Document, with indication, where appropriate, of the relevant passages  | Relevant to Claim No. |
| A   | US,A,4579762 (UCCI) 01 April 1986<br>see column 2, line 46 - column 3, line 23;<br>claims 1, 6<br>---   | 1                     |
| A   | US,A,4824709 (TSCHIRCH) 25 April 1989<br>see column 2, line 48 - column 3, line 9<br>see column 5, lines 3 - 20; figure 1<br>---  | 1, 2, 8,<br>11        |
| A   | FR,A,2260656 (VEB LEUNA-WERKE <<WAKTER<br>ULBRICHT>>) 05 September 1975<br>see page 1, line 37 - page 2, line 31<br>see page 4, lines 28 - 35<br>see page 9, lines 13 - 28; claims 1, 18<br>--- | 1, 2, 6,<br>11        |
| A   | GB,A,977550 (THE DOW CHEMICAL COMPANY)<br>see page 1, lines 46 - 59<br>see page 3, lines 45 - 87<br>---   | 1, 2, 8,<br>11        |
| A   | GB,A,1141231 (M.G.LEVASSEUR)<br>see the whole document<br>---   | 1                     |
| A   | GB,A,1312311 (CARL FREUDENBERG) 04 April 1973<br>see page 1, lines 22 - 54<br>see page 1, line 81 - page 2, line 27<br>see page 2, lines 52 - 63<br>see page 2, lines 75 - 78; figure 2<br>---  | 1, 5                  |

**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.**

GB 9001057

SA 38249

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19/11/90

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s)  |  | Publication<br>date                                      |
|---|---------------------|---|--|--|
| US-A-3940525                              | 24-02-76            | None  |  |  |
| GB-A-1168285                              | 22-10-69            | BE-A- 700199<br>DE-A, B 1635599<br>FR-A- 1529068<br>NL-A- 6708764<br>US-A- 3542613                              |  | 20-12-67<br>07-10-71<br>27-12-67<br>24-11-70             |
| US-A-3519526                              | 07-07-70            | BE-A- 701493  |  | 18-01-68   |
| US-A-4579762                              | 01-04-86            | None  |  |  |
| US-A-4824709                              | 25-04-89            | None  |  |  |
| FR-A-2260656                              | 05-09-75            | BE-A- 825311<br>DE-A- 2502025<br>NL-A- 7501082<br>SE-A- 7501271<br>US-A- 3975562                                |  | 29-05-75<br>14-08-75<br>12-08-75<br>11-08-75<br>17-08-76 |
| GB-A-977550                               |                     | BE-A- 538252<br>DE-B- 1028284<br>DE-B- 1232545<br>FR-A- 1359514<br>GB-A- 971958<br>NL-A- 293522<br>NL-A- 293524 |  |  |
| GB-A-1141231                              |                     | None  |  |  |
| GB-A-1312311                              | 04-04-73            | DE-A- 2009182<br>NL-A- 7003196<br>US-A- 3669819   |  | 19-11-70<br>10-11-70<br>13-06-72                         |